Meeting Notes
California State Lands Commission
Performance Standards Technical Advisory Panel Meeting #5
Monday, August 8th, 2005

Meeting Attendance

Marian Ashe - CA Department of Fish & Game	Bill Jennings – Delta Keeper (Conference Line)
John Berge - Pacific Merchant Shipping	Giselle Johnston – CSLC
David Bolland – Association of CA Water Agencies	Steve Moore – SF Bay Water Board
Bradly Chapman – Chevron Shipping Inc	Sarah Newkirk - Ocean Conservancy (Conference Line)
Andrew Cohen - SF Estuary Institute	Greg Ruiz – SERC (Conference Line)
Maurya Falkner – CSLC	Lisa Swanson - Matson Navigation
Andrea Fox – CA Farm Bureau	Christina Simkanin - Portland State University (Conference line)
Suzanne Gilmore – CSLC	Drew Talley – UC Davis (Conference Line)
Marc Holmes – Bay Institute	Lynn Takata – CSLC
Jeff Herod – US Fish & Wildlife Service	Kim Ward - SWRCB (Water Quality Division)

Meeting Materials
- Holmes: Draft Proposed Outline of Advisory Panel Report and Recommendation to the State Lands Commission
- Cohen: Background and Possible Basis for a Zero Discharge Standard
- Cohen: Basis for a Standard Based on the Natural Rate of Invasion
- Cohen: Some Data on Treatment Costs and Economic Indicators
- Bolland: Additional Options for Consideration
- Michigan Senate Bill 332 and House Bill 4603
- Revised Comparison Table with Michigan Information and WA % reduction
- CSLC: Poll survey with 4 possible options for recommendations

Action Items from July 13th Meeting
- Main points of Michigan's Ballast Water regulation:
    - Adopts an NPDES permit program for ballast discharges
    - Ships must not discharge ANS or have approved treatment technology
    - Definition of zero ANS discharge is not defined in the law
- Michigan information has been inserted into the standards comparison table for reference
- Washington's percent reduction has been converted and inserted into the comparison table

Status of the final Advisory Panel Meeting
The Marine Invasive Species Act of 2003 requires CSLC to prepare and submit the final report on Performance Standards to the Legislature by January 31, 2006. The report must be approved by the Commission in advance of submittal to the Legislature. Based on the Commission's current meeting schedule, staff expect to take the draft final report to a late-2005 Commission meeting. The CSLC draft final report needs to be completed no later than November 15, 2005 to allow for appropriate in-house review. Therefore**,** recommendations from the Technical Advisory Panel should be provided to the CSLC on or about September 6th, 2005 in order to incorporate its results into the draft final CSLC report. Staff requested that any appended reports representing minority opinions are not to exceed 5 pages. The advisory panel as a group decided to make this August 8th meeting their last meeting. They will then

finalize the recommendations in a report format while circulating drafts of a final report to be submitted by September 6th to the CSLC.

Framework for Recommendations

Several Panel members expressed the need for a framework to help the group decide on final recommendations. Two key issues required some discussion during the August 8th meeting:

1) Choose a process to decide upon recommendations for standards (i.e. voting procedure);
2) Format of final products from the advisory process (i.e. Final group report, Individual reports)

As possible tools to help the group reach some level of consensus and to help provide a format for the final advisory group products, the following items were discussed:

- Suzanne Gilmore sent out prior to the August 8th meeting a survey for participants to choose (and comment as appropriate) one of four options:
    - Option #1: Zero as ultimate goal by 2016 and SB 363 as interim standards
    - Option #2: Zero as ultimate goal by 2026 and SB 363 as interim standards by 2016
    - Option #3: Adopt USCG Performance Standards once made public & SB 363 as interim
    - Option #4: IMO Convention as is with periodic review

- During the August 8th meeting, David Bolland dispersed a handout with an "Additional Option for Consideration" which was determined to be an intermediate between option #2 and #3 of original survey. Content was as follows:
    - Zero detection for larger organism classes (50 microns or greater) – define it for only larger organisms (deadline: 2009 for new vessels, 2016 for existing). Detection implies an increasingly stringent standard as time goes by.
    - A "Twice the natural invasion rate" – based standard for smaller organisms. In the hand out, this is a range, and the committee would pick a number within that range for the standard.
    - A human health-based standard for bacteria and viruses. The standard would be human health based, using the human health indicator species.
    - Could be an element of periodic review, specifically to see if 2nd or 3rd (10-50 micron, and bacteria/virus class) standards should be tightened through time.
    - According to the IMO implementation schedule. These standards above to be effective by 2009 for new ships and by 2016 for pre-existing ships.
    - Moore (Comment) – Likes this framework. Since you can't get zero in the 10-50 size class, the natural rate gets at a stringent standard based on a biological concept, but gets around technological limits. Believes it is protective of resource, while recognizing the limits of technology.

- Sarah Newkirk sent an email to the group suggesting a format for the final report and recommendations. Main points:
    - The Committee will arrive at recommendations for standards by a majority of the voting members of the Committee
    - The Committee will submit a brief report to the State Lands Commission that outlines the recommendations and explains the basis for them
    - Committee members may submit minority positions, and these will be included in an appendix report

- Marc Holmes sent to the group a draft outline to assist with the final report preparation

- Andy Cohen sent three background documents to the group:
    - Background and Possible Basis for a Zero Discharge Standard

- Basis for a Standard Based on the Natural Rate of Invasion
- Some Data on Treatment Costs and Economic Indicators

Discussion on Natural Invasion Rate

Greg Ruiz shared several points relevant to the natural rate of invasion concept. He agrees that the idea is a compelling one, and maybe useful in the future, although currently it may be premature to base performance standards on this estimated rate. Main points:

- The concept was discussed at the IMO convention but omitted due to:
  - Fairly high level of uncertainty
  - Very little robust, testable data to support the concept
- It is challenging to populate the model with meaningful inputs.
- The estimate is based solely on the fossil record of shelled mollusks, and therefore soft bodied organisms (such as polycheates, bryzoans, phytoplankton, and microbes) are not incorporated into the model.
- The fossil record is temporally biased. Some time periods are better preserved in the fossil record than others, and the invasion rate could consequently underestimate periods with lower preservation.
- Geerat Vermeij's paper is one of the best sources of supporting data on the subject. Although there is still some level of uncertainty because it is 1) Difficult to interpret, 2) Based on a very limited number of species between 2-5 million years, 3) Only considers a few source regions (HI and three others). The numbers identified for shelled mollusk species look good, but soft bodied organisms are not represented. When considering additional source regions and different time scales, it is very unclear how well "natural invasion" would extrapolate form these data.

Several comments from participants were in agreement that the natural invasion rate may be inaccurate, although the concept could still be applied to a recommended standard.

- (Berge) The numbers associated with an estimated natural rate are so small that they could essentially be deemed as zero.
- (Cohen) The estimated natural invasion rate would actually be 1-2 orders of magnitude different from the SB 363.
- (Ashe) The debate is academically important, but will require more analysis and input to apply the concept within a regulatory framework.
- (Newkirk) The estimate is precautionary and a good attempt to get a non-zero standard that is biologically protective. It may not be precise, but at least makes an effort to lower the standards further than current regulations or proposed bills.
- (Bolland) It doesn't seem appropriate to choose one number over another just because one is smaller. However, if regulators are willing to get to zero, maybe this is a good idea especially because we don't have enough data to evaluate which number is better.
- (Moore) There are other examples of standards based on loose constructs. As an example, the EPA outlined how often a concentration could be exceeded for toxic pollutants. This was based on just a few studies regarding ecosystem recovery that were averaged over time. The amount of biological evidence is not as robust as might be preferred, but it nonetheless ended with a workable standard. It does seem that we could use a construct based on the natural rate of invasion, as long as it is based on some scientific rationale.

Treatment Technology Capabilities

Marc Holmes requested comments from those with experience or knowledge about water treatment capabilities and practicalities of implementation for suggested standards. Additional questions surfaced about how a 'zero' standard might be enforced and/or tested.

- (Moore) In terms of drinking water, agencies look at what is theoretically possible using filtration as an example and then what is operationally possible for testing the efficacy of that treatment.

- (Cohen) Many treatment systems are similar, whether using filtration alone or a multi step process, filters are capable to remove 50-100 micron particles. This would suggest that for larger size classes, treatment can meet a zero discharge standard.
- (Falkner) Current ballast treatment technologies, which use a multi-step process of filtration as the primary phase and a secondary phase of Ultraviolet light work for small volume vessels (passenger, newer container, etc.). As for larger volume vessels (i.e. bulkers & tankers), treatment becomes more difficult because the large volumes of water can't be processed fast enough. As for what technologies are available, the engineering question is a huge hurdle. Vessel crews are small, and have to handle many things simultaneously. Matson is requiring integration and redundancy with other systems, so the crew doesn't have to worry about safety/operation difficulties.
- (Falkner) Examples of other treatment technology types are utilizing chemicals such as dosing chlorine dioxide. Zero would be a good ultimate goal, but the question is how to get there with technological capability. Industry has expressed that they just want a target, and technology costs will consequently drop as competition increases within the industry. Also, there should be some level of protection over time for vessel owners who choose to invest in a treatment technology to ensure they won't require replacement within an unreasonable timeframe.
- (Berge) Agrees with Maurya, but adds that if CA's standards are different from other national or international standards, it won't provide technology developers incentive to move forward. Technology developers will strive to meet standards which are in the majority.
- (Newkirk) Argues that a standard set for the sake of consistency is unreasonable. Technology developers will not ignore an industry as huge as CA's. We need to accept some unknowns that are probably not knowable, such as the abilities of future technologies, and select something that is logically reasonable. The implementation schedule in SB 363 is too slow.
- (Holmes) If an unreasonable standard is set, then it will be disregarded, and therefore would not be effective. However, if CA is considering "effective 0" and so is Michigan, and then we should reach for a goal that ultimately meets a non-invasion scenario. Goals should be:
    1. Biological efficacy (eliminates or reduces invasions)
    2. Practicable implementation (interim standards for existing vessels, new builds)
    3. Identification of treatment technologies that can meet these goals. If technologies can't meet the goals in time, then the standards should be relaxed to accommodate progress.

As the meeting progressed, discussions continually cycled back to the current and foreseeable capability of treatment technologies. A prominent issue with testing technologies is that in a laboratory environment, technologies perform very well. Past studies have found that once a technology is tested onboard an operational vessel, the system is subject to unforeseeable complications, which lowers the performance level. There have been so few studies on efficacy onboard operational vessels, it is really too soon to say for certain whether technologies can meet or exceed the IMO standards.

Implications of a "Zero" Standard

In terms of a regulatory framework as well as impacts to the industry, the implications of a "zero" standard were addressed. Discussion took place as to whether a more stringent standard such as zero should be recommended now, or if interim standards should be recommended with a review schedule for increased stringency over time. Main points from the discussion were as follows:

- (Moore) With the NPDES process, once a standard is met, a new more stringent standard is not developed. In general terms, a standard set now will be in effect for a lifetime. Under these circumstances, it seems most effective to set a stringent standard now.
- (Chapman) I support setting an interim standard first, and applying a periodic review schedule to increase the stringency over time according to technological advancement which may ultimately lead to zero.
- (Berge) Supports a long term goal of zero, but the implementation schedule should be carefully considered.

- (Jennings) When water quality standards are too stringent and can't be met, they are relaxed later. It would be useful to discuss whether zero is an unreasonable target.
- (Chapman) As long as there is adequate time for implementation, zero is not an unreasonable target.
- (Berge) If we end up with the same scenario as the State of Washington, the consequence could be that the standard will be ignored because there would be no traction for implementation.

Throughout the discussion there was an ongoing divergence as to whether California would suffer from economic losses if the performance standards are made too stringent. Several participants were not convinced there would be economic losses because of major port zones in California such as LA/LB and Oakland. Other participates argued that vessels would call to ports outside of California if standards are made too stringent. Andrew Cohen offered an example of ballast water exchange regulations where a similar debate took place in the late 90's. California's ballast water exchange regulations were instead adopted on a national level as well as by other states. This example highlights how more stringent standards in California could produce the same results where other state and federal agencies adopt more stringent standards as well. Some level of agreement was reached that the real question is whether California's standards would be enough of an impetus for technology development.

"No discharge" Vessel Types

Discussion continued regarding the most appropriate implementation schedule and how a 'no discharge' may apply to different types of vessels. Certain vessels such as newer container ships are equipped without a need to discharge ballast. Although this scenario cannot be applied to all vessel types, advisory panel participants acknowledged this as a relevant consideration. Main points of the discussion:

- (Moore) Supportive of an implementation schedule that will encourage ship re-design for new vessels. By 2009, it seems we could require no ballast water discharge for new builds of suitable vessel types.
- (Berge) It is true that certain vessel types will not need to discharge ballast, however the issue will remain for larger volume vessel types and vessels that require full ballast discharge due to cargo operations.
- (Falkner) Maersk has some vessels that do not discharge ballast except for periodically refreshing 'permanent' ballast. Many container ships currently under construction are similar in design. It might be interesting to find out how many vessels are pursuing this design.
- (Chapman) In terms of tank vessels, no ballast discharge is currently being researched. So far results show that no or low ballast discharge tankers lead to less cargo space although research is ongoing.

Survey Options Discussion

Advisory group participants reviewed each of the four options presented on the original survey sent out prior to the meeting. As discussions progressed, the implementation schedule was separated from the actual standards for the purpose of clarity. Main Points regarding the survey options:

- (Fox) Would advocate for option #2 which would allow the industry ample time to retro-fit vessels and develop technologies for new builds. Suggests setting a standard with periodic review in order to account for technology development.
- (Berge/Chapman) Vote for option #4 which would be to adopt the IMO convention standards and implementation schedule.
- Option #4 was removed by a majority vote (except by industry representatives).

Considering that industry representatives hold the position of recommending the IMO convention without modification, the Advisory group decided to continue with a majority vote for

standards more stringent than the IMO. There was agreement between participants on an ultimate goal of 'zero,' but the date of implementation was still to be decided.

Implementation Schedule
Several ideas were developed during the meeting for an implementation timeline (addressed separately from actual standards). Timelines for an interim standard were discussed:

- Option #2 (i.e. 2016 new builds/2026 existing)
- Option #1 (i.e. 2009 new builds/2016 existing)
- A date of 2016 was decided for an interim performance standard. The interim standard would be reviewed to see when/if a date for the 'zero' goal could be reached or another interim date set.
- Report should be submitted to the legislature on the status of treatment technologies in 2016. The report should require a multi-year study of many vessels to evaluate technologies, and a recommendation for when a zero standard could be set.

The implementation schedule of the IMO convention was agreed upon by a majority vote. Participants agreed to recommend interim based standards which will be re-evaluated periodically according to the capabilities of treatment technologies.

Interim Standard Discussion (>50 micron Size Class)
Zero detection by 2012 for new builds and by 2016 for existing vessels (using the IMO convention implementation schedule).

Before consensus was reached regarding this size class, several key points were made as follows:

- (Chapman) Zero detection may be very difficult for larger volume vessels.
- (Falkner) Filters in lab tests and shore-side facilities are promising, but have only been tested for vessels with smaller volumes of ballast.
- (Chapman) 6-7 years for implementation is a very short timeframe for larger vessels, given the time it takes to build these vessels and the tight docking schedules.
- (Berge) The industry position for all standards will be IMO or SB 363, and will not change regardless of discussions.

Interim Standard Discussion (10-50 micron Size Class)
10^{-2} Reduction from unmanaged ballast water was voted by the majority, with a minority vote for 10^{-3}

Before consensus was reached regarding this size class, several key points were made as follows:

- This size class standard should be equal to or more stringent then the standard outlined in SB 363.
- (Ruiz) Feels the IMO standard for the 10-50 micron size class is not protective. SB 363 or an order of magnitude lower (more stringent) is what he would suggest for the 10-50 micron group.
- (Cohen) The US position at the IMO is a 3-4 log reduction from untreated ballast, and this seems achievable with current technologies.
- (Moore) If we recommend the US position at the IMO, it seems this would aggressively move towards a natural invasion rate.
- (Moore) The 3-4 log reduction parallels drinking water but the size class is larger.
- (Jennings) Can't recommend that organizations go to 10(-2), because a stronger standard can be met by technologies that would be more protective.
- (Talley/Newkirk) Would prefer 10^{-3}

Interim Standard Discussion (<10 micron Size Class)

At least 10^3 colony forming units per 100 mL reduction for bacteria, 10^4 colony forming units per 100 mL reduction for viruses, as well as standards for human health indicators as in SB 363.

Before consensus was reached regarding this size class, several key points were made as follows:

- (Ruiz) Feels that there are other microorganisms of potential great concern that affect fisheries or ecosystem dynamics that are not addressed by currently proposed standards of IMO & SB 363. Proposes to broaden the scope of standards for this size class beyond target organisms as in IMO and SB 363. No specific recommendation, other than it should be lower than exchange efficacy.
- (Ruiz) In response to a question regarding marine disease prevention and possible indicators to use. Usually these types of indicators are not representative for invasions via ballast pathways. One option might be to parallel standards with larger organisms, look at gross measures of reduction such as direct counts using flow cytometry. Suggest incorporating total concentrations for all bacteria. There is technology available to count smaller organisms, which is not necessarily easy, but technologies can be developed to detect concentrations of organisms in ballast.
- (Bolland) Seems that we have 2 options: A recreational based standard, or something that is more stringent than recreational standards.
- (Cohen): Recreational standards address only pathogens/human health, not the environment. This potentially misses the goal of ecological protection. It is possible that a human health target could reduce all pathogens in ballast, but also possible that it won't. Suggests 10(3) in this size class per 100 ML, 10(4) for viruses per 100 ML.
- (Moore) Suggest that in addition to Andy's proposal we also recommend the indicator organisms from SB 363. Good justification for this would be that it includes a public health standard, but also accounts for invasions that would otherwise be missed.

Final Report Outline and Framework (Marc Holmes)

Marc reviewed the draft outline sent out to the group prior to the meeting. He discussed each section as follows:

1. Description of problem and cause
2. Overview of existing standards proposed
3. Review proposed standards discussed
4. Body of report:
    - Standards
    - Treatment technologies
    - Implementation framework
5. Rationale for developing recommendations (3 criteria):
    - Protection of beneficial uses
    - Technical feasibility
    - Economic feasibility.

Comments on the outline:

- Outline didn't address issue of technology approval, and does not prescribe a technology specifically, but a testing procedure that must be developed to approve various technologies.
- (Falkner) The CSLC is coordinating with the USCG STEP program. There would have to be a more formal contracting situation should the report address this, to ensure rigor. This is something CSLC could do.
- Majority agrees with Marc's outline. Marc Holmes volunteered to draft report by Sept. 6th.
- Minority reports were decided to be placed in an appendix of the final report and incorporated within the text as appropriate.
- Majority agreed that the report will be more narrative than short captions so as to address the larger audience including State Lands Commissioners.

- The final Advisory group report will likely be an appendix to the larger CSLC staff report to be submitted to the legislature in January 2006.
- Email list will be modified to include active participants for the purposes of drafting the Advisory group report.

Adjourn 12:30 pm